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ABSTRACT

Online collaborative documents can be used effectively for conducting collaborative research and for learning collaboratively via the Internet. Collaborative documents are dedicated online workspaces that allow individuals or groups to use the Internet to share their work with others, edit it, and finalize it. This paper identifies Basic Support for Cooperative Work and FirstClass as Internet tools that have enabled collaboration across distance for both research and coursework, and it provides real-life applications of those tools in higher education. Discussion includes an American-Taiwanese cooperative online tutorial; small-group discussions; project-based work; collaborative problem-solving activities; brainstorming; and case-based learning. (Contains 28 references.) (Author/AEF)

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Online Collaborative Documents for Research and Coursework

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Abstract

Online collaborative documents can be used effectively for conducting collaborative research and for learning collaboratively via the Internet. Collaborative documents are dedicated online workspaces that allow individuals or groups to use the Internet to share their work with others, edit it, and finalize it. This paper identifies Basic Support for Cooperative Work and FirstClass as Internet tools that have enabled collaboration across distance for both research and coursework, and it provides real-life applications of those tools in higher education.

Introduction

We use online collaborative documents for conducting collaborative research and for learning collaboratively via the Internet. The increased use of the Internet in higher education has allowed researchers to conduct collaborative research and faculty to provide opportunities for students to work collaboratively in their courses. Collaborative documents are dedicated online workspaces that allow individuals or groups to use the Internet to share their work with others, edit it, and finalize it. Real-time chats, computer conferences, and email may be used to support collaborative documents but are not collaborative documents according to our definition because they are not dedicated workspaces.

Collaborative learning is an instructional method in which small groups of learners work together to accomplish shared goals (Slavin, 1994). Similarly, computer-supported collaborative work allows working groups distributed in time and space to use groupware. Various Internet tools have enabled collaboration across distance for both research and coursework.

Collaborative Documents for Research

Since the advent of email, and fax, researchers across distances have used telecommunications to write documents together—getting feedback from co-researchers and incorporating those ideas into the manuscript. Eventually, through multiple- iterations, the document becomes a final product. The early Internet researchers had to think creatively so that their co-collaborators could discern the changes made to the document. For example, in 1991 two researchers co-authored a book chapter using boldface type, square brackets, and initials and dates via email between their two universities (Murphy & Rogers, 1993).

Electronic bulletin board systems and computer conferencing software such as Wildcat, VAXNotes, LotusNotes, and Web boards allow users to hold asynchronous, threaded discussions online. Through such server software, co-researchers can share their ideas in an organized manner without using their own disk space. Most of the early software programs did not allow attachments. More recently, we have used several Web tools with shared workspaces for conducting our research: Basic Support for Cooperative Work (BSCW) because of its capabilities for file attachments and version control; and FirstClass computer conference software because of its asynchronous and synchronous communication, file transfer, and collaborative document functions. See Table 1 for shared characteristics and Table 2 for differences between BSCW and FirstClass.

Table 1. Shared Characteristics of BSCW and FirstClass

Server-based
Individual and collaborative workspaces
Text-based
Asynchronous threaded discussions
File attachments
Links to Internet
Cross-platform

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Table 2. Differences between BSCW and FirstClass

BSCW	FirstClass
Free	Requires a license
Web accessible	Web and client accessible
Icon and menu driven	Graphic user interface
No synchronous chat capability	Synchronous chat capability
Automatic version control	Manual version control
Steep learning curve	Short learning curve
Complex organization	Simple organization
Meeting notification	Special forms

BSCW description and research examples

The process of file attachments and version control in BSCW is relatively simple. Researcher 1 first attaches a file in a workspace and then establishes version control on the file. Researcher 2 then downloads the file, uses typical editing functions (e.g., colored font, boldface type, comments in brackets, dates), saves it, and uploads it to the dedicated workspace. All versions of a document are maintained in the workspace without being over-written. Although the researchers do not rename the file as they upload it, the BSCW software automatically assigns the new file with a new version number and names the author of that version. When multiple collaborators create a document, this process of version control keeps track of multiple iterations. The primary disadvantages of using BSCW are its steep learning curve and a slow rate of speed in updating Web pages due to the extensive graphics on the BSCW Web site.

Researchers have used BSCW for shared research in co-authoring papers and manuscripts between two countries or cities. For example, prior to working on manuscripts when one would be in Taiwan and the other in the U.S., the second and third authors met face-to-face to establish the method of exchange and encountered the following problems only after one researcher traveled to Taiwan: (a) figures created on one platform did not always show up on another; (b) communication was interrupted when an undersea cable linking the United States and Taiwan was damaged; and (c) communication was delayed when Internet traffic was jammed in Taiwan. This Internet traffic worsened when students were out of school during vacations. Fortunately, the telecommunications company arranged for the net users to transmit data through a backup cable as well as a satellite-based network (Cifuentes & Shih, 2001; Hsu, 1999; Staff Reporter, The China Post, 2001). Similarly, the first author met face-to-face twice with two co-authors to brainstorm the method and later to analyze data, and they accomplished the remainder of the research using BSCW's version control to communicate between two cities in Texas (Murphy, Mahoney, & Harvell, 2000).

A second example of how researchers use BSCW for shared research is in guiding dissertation research. The first author designates a shared workspace for each of her doctoral students in her own workspace. The students are each responsible for posting drafts and final versions of their work in their workspaces for the dissertation chair to read, edit, comment, and guide the process. A typical doctoral student's BSCW workspace includes the following folders: Bibliographies, Discussions, Meeting Notes, Prelims and Orals, Proposal Components, Dissertation Components, and Resources. The researcher finds BSCW a convenient and powerful tool to track the progress of her doctoral advisees as well as share resources among the students.

FirstClass description and research examples

Researchers suggest that the very nature of computer conferencing—its capacity to support interaction among students—fosters a collaborative approach to learning (Harasim, Hiltz, Teles, & Turoff, 1995). FirstClass computer conference software provides multiple functions that foster collaborative research and learning: threaded discussions in icon-based conferences, file attachments, private email, real-time text-based chats (Persico & Manca, 2000), and collaborative document writing spaces. The text-based collaborative document writing spaces allow only one person to edit a document at a time, using word processing capabilities like font types, colors, and sizes. However, multiple readers can access these continuous unbroken documents simultaneously. Currently, the client version of FirstClass must be used in order to open and write in collaborative documents, as the Web version does not provide that capability.

The first author and several local doctoral students used FirstClass collaborative documents to prepare two conference papers (Murphy, Harvell, Epps et al., 1999; Murphy, Harvell, Sanders, & Epps, 1999). The shared workspaces provided the authors with "boundaries around a protected space, with the members of the group sharing a common experience" (Palloff & Pratt, 1999, p. 61). In both cases, the researcher was careful to save the collaborative documents to her hard drive daily, because such documents cannot be protected and still allow multiple users to access the document.

Collaborative documents for coursework

With the advent of the Web for course support or delivery, designing authentic and relevant activities that foster collaboration among learners has become a challenge for instructors and course designers (Carr-Chellman & Duchastel, 2000; Cifuentes, Murphy, Segur, & Kodali, 1997). Collaborative workspaces and documents facilitate a variety of learning activities in Web-based courses including tutorials (Cifuentes & Shih, 2001; Cifuentes & Shih, in press; Davis & Chang, 1994/95; Kamhi-Stein, 1997; Leh, 1997), small-group discussions, project-based work, collaborative problem-solving activities (Romiszowski, 1997), brainstorming (Kay, 1995; Neuhaus, 1997; Siau, 1995, 1996), and case-based learning (Ertmer & Quinn, 1998). In collaborative workspaces and documents in BSCW and FirstClass, learners can identify their contributions by dating and signing them and by using different colors. Because a FirstClass collaborative document is a continuous unbroken document that allows users to "get a holistic view of the activity without having to open and close numerous messages" (Murphy & Gazi, in press), learners find the

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tool easy to use for brainstorming and planning activities as well as for editing each other's work. In the following sections, we illustrate applications from our coursework of each of the preceding learning activities.

Tutorial

American and Taiwanese university students corresponded via e-mail and a Web-board to prepare U.S. preservice teachers for online teaching and reaching diverse learners, and to provide English instruction to the Taiwanese students. U.S. preservice teachers explored theory and practice of online instruction, corresponded as tutors to teach English language and American culture, and reflected upon their experiences. Taiwanese students practiced English and exchanged cultural information. Throughout the correspondence, the two parties made use of different strategies to achieve their predefined instructional and learning goals. The preservice teachers employed a total of seven online teaching strategies: (a) facilitative information, (b) questions and answers from tutor to student, (c) questions and answers from student to tutor, (d) topic discussion, (e) problem solving, (f) critique of writing, and (g) recommendations for metacognition. Similarly, the Taiwanese learners used ten online learning strategies: (a) responsive dialogue, (b) translation, (c) responding to tutors' questions, (d) asking questions of tutors, (e) explanation, (f) elaboration, (g) decision-making, (h) self-reflection, (i) metacognitive strategies, and (j) transfer (Cifuentes & Shih, 2001; Cifuentes & Shih, in press).

Small-group discussions

All online classes in our educational technology program, and most classes that are not online, include online discussion spaces. Students discuss course readings and learn how to moderate discussions on specific topics.

Project-based work

In an introductory instructional design course, students used FirstClass to conduct project-based work in small groups. Students work with a client and often with an online team to carry out the phases of instructional design. For instance, two students living in cities separated by hundreds of miles designed and developed teacher training on thematic-unit design for a school district. They shared design and development processes using a dedicated space in FirstClass. They established goals; designed instruments for analyses of the learners, context and goals; wrote objectives and developed assessment instruments, shared evaluation data, and assigned development tasks to each other in FirstClass.

Students in introductory distance learning courses at two universities used the FirstClass server at one of the universities to design, develop, and evaluate telecommunications-based case studies in small teams. Most teams scheduled regular online chats with their team members as well as working asynchronously in threaded discussions to collaborate on the project. Each group developed its own evaluation criteria, which the other groups used to evaluate its products.

In other courses students collaboratively produced instructional thematic units, Web pages, and computer graphics using FirstClass. In a class that focused on design and development of student-centered, technology rich thematic units (Roberts & Kellough, 2000), students teamed to develop those units. They brainstormed to agree on a theme for their team's unit and submitted contributions to the unit in the shared workspace. Contributions included readings of interest, PowerPoint presentations, WebQuests, ideas for telecommunications partnerships, and lesson plans.

Students also collaboratively created computer graphics by submitting those graphics to a team in a dedicated space in FirstClass. Team members could alter the PowerPoint presentations, PhotoShop files, and Director files and resubmit them with their embedded feedback and changes. In this way students were able to receive concrete feedback from both the instructor and fellow students in order to learn principles of effective design.

Collaborative problem-solving activities

For a survey course in educational technology, the instructor posed a simulated problem for students to address in FirstClass collaborative documents and threaded discussions. The instructor invented Mythica, a mythical oil-producing country comprised of 18 islands and inhabited by people accustomed to learning by rote memorization. The students' challenges were to answer questions related to the simulation and to submit a bid on a project for teaching English to the entire Mythica population. Three co-facilitators presented the simulation to two teams of their classmates, who responded to the questions in their collaborative workspaces. The teams competed for the winning bid by helping their teammates with refinements of their replies (Murphy, Moran, & Weems, 2000).

In a course about distance learning, students used FirstClass to complete training modules on Internet tools in dyads: a trainer and a trainee. The trainer first developed a training program for a specific tool, such as CU-SeeMe, and then delivered the training to the trainee via FirstClass as a pilot test. The trainee was responsible for giving feedback to the trainer regarding accuracy and clarity. After the trainer made the necessary revisions and the trainee approved them, the student Webmaster published the training programs on the Web for other students to access and use. In the final step of this process, the trainer and trainee individually recorded their reflections about the experience (Murphy, Harvell, Sanders, & Epps, 1999). In most cases, the more experienced Internet user was the trainer; however, some dyads reversed their roles so that the inexperienced user would gain more expertise.

Brainstorming

Students in a Computer Graphics for Learning course used a dedicated space in FirstClass to brainstorm ideas prior to creating instructional animations. The assignment was for each student to develop an animation that would help learners understand a complex concept. In previous semesters several students had submitted animations that were primarily cosmetic rather than instructive. In an attempt to hinder such submissions, the instructor set up a brainstorming conference in FirstClass. In that conference, students were requested to enter their ideas for instructive animations and they were allowed to give each other feedback regarding the value and attributes of such an animation. One student's idea led to many students' ideas, and ultimately all students formulated good ideas for meaningful animations.

Case-based learning

In an introductory instructional design course, students analyzed cases following recommendations for case analysis (Ertmer & Quinn, 1998). They negotiated meaning regarding the nature of the problems posed and potential solutions using FirstClass. Students discussed 24 ID cases according to key issues of the cases, key players' perspectives, potential solutions related to problems, and recommendations for action.

Conclusions

Garrison's (2000) review of distance education theories describes the current need for "sustained real two-way communication" (p. 13) to be at the core of the educational experience. Until recently, the field was dominated by organizational (structural) assumptions. However, with the advent of new methods and technologies, the field will "demand theories that reflect a collaborative approach to distance education…and have at their core an adaptive teaching and learning transaction" (p. 13). One way to apply such theories to research and coursework is to use collaborative documents to promote transaction culminating in deliberation among the key players. Such deliberation can create "a particular kind of democratic public culture among the deliberators: listening as well as talking, sharing resources, forging decisions together rather than only advocating positions taken earlier, and coming to disagreement" (Parker, Ninomiya, & Cogan, 1999, p. 129).

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